PATENT
32860-000786/US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	10/509,251	Group Art Unit:	2857
Filing Date:	September 28, 2004	Examiner:	Janet Suglo
Applicant:	Norbert GRASS		
Title:	PC-ARRANGEMENT FOR VISUALIZATION, DIAGNOSIS AND EXPERT SYSTEMS FOR MONITORING, CONTROLLING AND REGULATING HIGH VOLTAGE SUPPLY UNITS OF ELECTRIC FILTERS		

DECLARATION UNDER 37 C.F.R § 1.132

1. I, Norbert Grass, a resident at the address of Bergstr. 37 B, 91074 Herzogenaurach, of the country of Germany, declare and say that:

2. I am presently employed by Georg-Simon-Ohm University, Nuernberg

3. I obtained my doctorate degree from the Friedrich Alexander University, Erlangen, Germany Department of electrical energy, in the year of 1997;

4. I was an employee of Siemens Aktiengesellschaft until 2004 and was engaged in research and development in the area of monitoring, controlling and/or regulating high-voltage supply units and electrostatic filters.

5. Because of my own education and experience, I believe myself to be one of at least ordinary skill in the art of high-voltage supply units and electrostatic filters, which are commonly used in the cement and steel industries. Based upon my 18 years of experience, it is my opinion that one of ordinary skill in the art of high-voltage supply units and electrostatic filters would be one with a scientific degree, having at least 5 years of experience in the engineering or design of high-voltage supply units and electrostatic filters.

6. I have carefully read the originally filed version of U.S. Application No. 10/509,251 filed September 28, 2004, of which, I am the inventor.

7. I have also read claims 1-6, and 8-27 included in the Amendment filed with the United States Patent and Trademark Office (USPTO) on July 3, 2007, and understand how these claims relate to the disclosure of U.S. Application No. 10/509,251.

8. I have also read the references used to reject claims 1, 3-6, 8-21 and 23-27 in the Office Action mailed September 26, 2007. Specifically, I read Frank et al. (International Publication No. WO 99/60487) (hereinafter "Frank") and Dönig et al. (U.S. Patent No. 5,471,377) (hereinafter "Dönig").

9. I have been presented with the following facts regarding the previously mentioned claims of U.S. Application Serial No. 10/509,251 and the cited references of Frank and Dönig. The facts are as follows:

> The Examiner at the USPTO considers it obvious to combine the teachings of Frank with the teachings of Dönig to arrive at the features recited in independent claim 1. In particular, the Examiner states "Frank does not specify that the variety of systems includes high-voltage supply units for electrostatic filters. Dönig teaches controlling high-voltage supply units for electrostatic filters (Dönig: e.g., col. 1, ln 11-15). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Frank to include controlling high-voltage supply units for electrostatic filters as done by Dönig because this control method enables optimal operation, creates economic efficiency, and reduces personnel calls (Dönig: e.g., col 1, ln 45-50 and 59-63).

10. I, upon considering the specification and claims of Application No. 10/509,251, in view of the teachings presented in Frank and Dönig, and in light of my skill in the art of high-voltage supply units for electrostatic filters, have determined that there is no logical reasoning, motivation, teaching, or suggestion in either Frank or Dönig, which would cause one skilled in the art to apply the teachings of the system and method for object-oriented control of diverse electro-mechanical systems to controlling electrostatic filters described in Dönig. Thus, it is my opinion that it would not have been obvious to a person of the qualifications described in paragraph 5, to arrive at a PC arrangement for visualization, diagnosis and expert systems for at least one of regulating, monitoring and controlling high-voltage supply units for electrostatic filters having the features recited in independent claim 1. Reasons supporting this assertion are provided below in paragraphs 11-15.

11. I submit that electrostatic filters are primarily used in the cement industry, fossil power plants and/or steel industry. The field of electrostatic filters represents a very narrow segment of technology having specific rules that are rarely applied in other technical fields. As such, there is a relatively small group of experts that deal with the issues and problems related to control and regulation of high-voltage supply units for electrostatic filters.

12. My understanding from my review of Frank is that Frank discloses a general teaching for controlling (control and regulation) object-oriented electromechanical system with the aid of a computer network. Frank describes a detailed design of a computer network and how this network is connected to super-imposed systems. However, there is no disclosure, teaching or suggestion in Frank to indicate how the control system could or should be incorporated into the specialized optimization technology relating to electrostatic filters.

13. Instead, I submit that Frank contains contrary material that would actually prevent one skilled in the art of control and regulation of high-voltage supply units and electrostatic filters from using the teachings of Frank to control electrostatic filters, which are primarily used in the cement industry, fossil power plants and/or steel industry. In particular, page 19, line 18 to page 20, line 5 of Frank describes the use of a 32-bit processor and an Echelon co-processor. Bit rates of the processors, and especially the use of an Echelon co-processor, are significantly different from processors normally used in the cement industry, fossil power plants and/or the steel industry to control and monitor electrostatic filters. Indeed there is a prejudice against use of these processors, which operate with extremely high clocking rates because (i) the high clocking rates are subject to more errors than processors with lower clocking rates, and (ii) the operation during a malfunction is extremely difficult to reproduce with Echelon co-processors. As such, it is my opinion that one skilled in the art of electrostatic filters and high-voltage supply units would not use the method and system described in Frank to control high-voltage supply units for electrostatic filters.

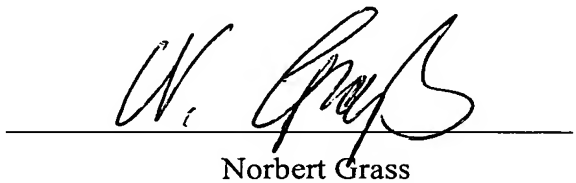
14. Further, I submit the control system and method disclosed in Frank is relatively complex and thus, also has a higher risk of malfunctions than the data net of a typical cement plant and/or steel plant in which electrostatic filters are primarily used. Page 16, lines 11-16 describes that a so to speak optional number of service objects can be operated and used,

however, this would result in errors or significantly higher costs. On the whole, the system described in Frank is so complex that it requires several hundred milliseconds for access times, as described at the bottom of page 16 of Frank. However, I submit this is completely unsuitable for the control and regulation of an electrostatic filter. It is my opinion that one skilled in the art of control and regulation of high-voltage supply units and electrostatic filters recognizes that an electrostatic filter must respond within approximately 25 milliseconds and, if possible, should even respond by 10 milliseconds.

15. Therefore, it is my opinion that one skilled in the art of high-voltage supply units and electrostatic filters would not use the control system and method described in Frank to control electrostatic filters such as those described in Dönig for at least the reasons set forth in paragraphs 11-15 above.

16. I hereby declare that all statements made herein are of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing from Application No. 10/509,251.

29.2.2008
Date


Norbert Grass

Source: USPQ, 1st Series (1929 - 1986) > U.S. Court of Customs and Patent Appeals > In re Oelrich and Divigard, 198 USPQ 210 (C.C.P.A. 1978)

198 USPQ 210

In re Oelrich and Divigard

U.S. Court of Customs and Patent Appeals

No. 78-502

Decided June 15, 1978

579 F2d 86

Headnotes

PATENTS

[1] Court of Customs and Patent Appeals -- Issues determined -- Ex parte cases (▶ 28.203)

Court of Customs and Patent Appeals would be more inclined to reach issue, under In re Pearson, 181 USPQ 641, rationale, of whether claim is anticipated by patent from which it is allegedly obvious under 35 U.S.C. 103, if that issue, which would be determined de novo, did not turn on facts not of record.

[2] Patentability -- Invention -- In general (▶ 51.501)

Pleading and practice in Patent Office -- Rejections (▶ 54.7)

Patent and Trademark Office must show that claimed subject matter would have been obvious to one of ordinary skill in art at time invention was made for patentability to be negatived under Section 103; this entails determination of scope and content of prior art, differences between claimed invention and prior art, and level of ordinary skill in art; in so doing, Office usually must evaluate both scope and content of prior art and level of ordinary skill solely on cold words of literature; one or both of these factual inquiries can become distorted when only literature is relied upon.

[3] Patentability -- Anticipation -- Publications -- In general (▶ 51.227)

Speculative statements appearing in prior art literature are good for purposes of rejection under Section 103 for all that they would fairly suggest to one of ordinary skill in art.

[4] Evidence -- Expert testimony (▶ 36.10)

Patentability -- Evidence -- In general (▶ 51.451)

Patentability -- Tests of -- Skill of art (▶ 51.707)

Showings of fact are much preferred to statements of opinion; nature of establishment of obviousness of claimed matter and strength of opposing evidence must be taken into consideration in assessing probative value of expert opinion that was introduced on issue of level of ordinary skill, which is usually determined by reference to subjective reaction of persons so skilled, and is opposed by fragile prima facie case of obviousness.

[5] Patentability -- Invention -- In general (▶ 51.501)

Question under Section 103 is not whether one skilled in art doing what patent applicants did would have discovered what they discovered, but whether it would have been obvious to one of ordinary skill in art to do what they did.

Page 211

Particular Patents

Particular patents -- Control Mechanism

Oelrich and Divigard, Sub-Critical Time Modulated Control Mechanism, rejection of claims 1-5 *reversed.*

Case History and Disposition

Appeal from Patent and Trademark Office Board of Appeals.

Application for patent of John A. Oelrich and Albert J. Divigard, Serial No. 452,050, filed Mar. 18, 1974. From decision rejecting claims 1-5, applicants appeal. Reversed.

Attorneys

Roger A. Van Kirk, and Fishman & Van Kirk, both of East Hartford, Conn., for appellants.

Joseph F. Nakamura (Thomas E. Lynch, of counsel) for Commissioner of Patents and Trademarks.

Judge

Before Markey, Chief Judge, and Rich, Baldwin, Lane, and Miller, Associate Judges.

Opinion Text

Opinion By:

Rich, Judge.

This appeal is from the decision of the Patent and Trademark Office (PTO) Board of Appeals (board) affirming the rejection of claims 1-5 in appellants' application serial No. 452,050, filed March 18, 1974, for "Sub-Critical Time Modulated Control Mechanism," under 35 USC 103 as obvious from U.S. Patent No. 3,430,536 for "Time Modulated Pneumatically Actuated Control Mechanism," issued March 4, 1969, to John A. Oelrich, one of the present joint applicants. We reverse.

The invention relates generally to control mechanisms used, inter alia, to move steering fins on guided missiles. The device responds to an electrical signal from the missile guidance system, variously described as the "command," "input," or "error" signal, the magnitude of which is proportional to the desired amount of course-correcting fin movement, and converts this signal into a pneumatic pressure of appropriate magnitude which acts on a piston to move the fin. Before describing the particulars of the claimed invention, we will briefly describe the prior art control devices cited by the PTO which appellants concede to have been the starting point of their invention.

An exemplary embodiment of the priorart actuator described in the Oelrich patent is illustrated below:

Tabular, graphic, or textual material set at this point is not available. Please consult hard copy or call BNA at 1-800-372-1033.

Cyclic energization of solenoid 6 by a periodic carrier signal (illustrated) alternately pressurizes and exhausts piston working area 18. The cycle is so fast that time delays resulting from the size of inlet port 10(Au) and exhaust port 11(Ad) cause a steady-state pressure to be approximated in area 18 which is balanced by constant pressure on piston surface 20 when the control is in the neutral or "null" position. When a command signal (illustrated) is superimposed on the carrier signal in summing amplifier 14, switch 29 responds to the altered signal to alter the relative durations of solenoid energization and solenoid de-energization within each cycle.

For example, a command signal increasing the magnitude of the signal which reaches switch 29 will cause the solenoid to be energized for a greater portion of each cycle than it is de-energized. Accordingly, pressurization time is greater than exhaust time, the approximate steady-state pressure in area 18 is increased, and piston 28 moves to the right, thereby moving the steering fin (not shown). If the command signal decreases the magnitude of the signal reaching switch 29, the solenoid will be de-energized for a greater portion of each cycle than it is energized, exhaust time will be greater than pressurization time, the steady-state pressure in area 18 is reduced, and piston 28 moves to the left. Such operation of the actuator is said to be "time modulated."

At any given time, the pressure in area 18 will fluctuate somewhat in accordance with the frequency of the bursts of pressurized gas received therein, which, in turn, depends on the carrier signal frequency.

These pressure variations cause slight load (fin) movements attributable to the carrier signal rather than the command signal, and such movement is termed "dither." Some dither is desirable in overcoming friction, often termed "coulomb friction," which might otherwise cause the control to stick in its neutral position. Such

Page 212

a desirable degree of dither is manifested as a slight vibration of the device. Excessive dither, sufficient to cause significant load (fin) movement, is obviously undesirable. The pressure fluctuations that cause dither are known to depend, inter alia, on the impedance or responsiveness of the load and the carrier signal frequency.

A second factor governing operation of the Oelrich control systems is that each such system has a natural resonant frequency, sometimes termed "critical frequency." When excited by a carrier signal at the critical frequency, system response is out of proportion to input; that is to say, uncontrolled oscillation of the steering fin occurs.

The parties seem to agree that the device disclosed in the Oelrich patent was employed only with the then available steering fins which they characterize as "high inertia" loads. According to Fig. 7 of the Oelrich patent, dither amplitude, expressed in terms of "dither amplitude ratio," [1] and carrier frequency in systems employing such loads were known to be related generally as follows (increasing spring rate connotes increasing load, and resonant peaks (broken lines) are shown as moving to the right with increases):

[1] "Dither amplitude ratio" is the ratio of actuator output motion to the amplitude of the duty cycle (carrier signal).

Tabular, graphic, or textual material set at this point is not available. Please consult hard copy or call BNA at 1-800-372-1033.

The Oelrich patent states that it is *preferred* to operate the control using carrier frequencies *above* the critical frequency in order to obtain the desired low dither amplitudes in the area where the curves converge. The control there described, however, is subsequently characterized as "adapted to receive a carrier frequency substantially in excess of the particular system critical or resonant frequency * * *."

The Invention

With the advent of light-weight missile steering fins, it became desirable to employ the Oelrich control with *low* inertia loads. It was found, however, that the critical frequency of such a system was so high that super-critical operation exceeded the practical capabilities of available solenoids, which are stated to have an upper frequency limit of about 175 Hz. Appellants discovered that the Oelrich control, coupled to a *low* inertia load, can be operated with a *sub-critical* carrier frequency without incurring unacceptably large dither which, they allege, would have been expected by those of ordinary skill in the art based on the known frequency-response characteristics of *high* inertia systems. Claims 1 and 2 are illustrative and read (emphasis ours):

> 1. A time modulated fluid actuated control *apparatus* comprising:
>
> housing means, said housing means defining a cylinder; actuator piston means disposed in said housing means cylinder; said piston means including an output member adapted to be connected to a movable load, said load and control apparatus defining a system having a range of resonant frequencies;
>
> solenoid operated valve means mounted on said housing means, said valve means being selectively operable to deliver pressurized fluid to and to vent fluid from said housing means cylinder at one side of said piston means;
>
> means for generating variable input command signals commensurate with the desired position of the load, said command signals being characterized by a dynamic frequency range below said range of said resonant frequencies;
>
> *means for generating a signal at a carrier frequency, said carrier frequency being greater than the maximum dynamic command signal frequency and less than the minimum system resonant frequency;*
>
> means for modulating said carrier frequency signal by said command signals; and
>
> means responsive to said modulated carrier frequency signal for controlling energization of

said solenoid operated valve means.

2. The *method* for the control of a pneumatic position control mechanism employing an expansible chamber motor having an output shaft couple [sic] to a movable load, said method comprising the steps of

generating a command signal commensurate with the desired position of the movable load coupled to the control mechanism motor output shaft, the frequency of the command signals being within a range determined by the primary band width of the actuator system

Page 213

including the control mechanism and the load;

generating a carrier signal at a frequency less than the minimum resonant frequency of the actuator system and greater than the maximum command signal frequency;

modulating the carrier frequency signal with a command signal; and

controlling the delivery of pressurized gas to the position control mechanism expansible chamber motor in accordance with the magnitude of the modulated carrier frequency signal.

The Rejection

[1] The examiner rejected claims 1-5 under 35 USC 103 as obvious from the Oelrich patent, noting the reference's specific teachings that carrier frequencies yielding "a degree of dither" were desirable and that super-critical operation was merely *preferred.* [2] The general teachings of Oelrich that carrier frequency should be selected to optimize system performance indicated to the examiner that selection of a particular carrier frequency was "a mere choice in design" and that optimization of a low-inertia system would have led to the claimed modification.

[2] Nobody has at any time asserted that apparatus claim 1 is *anticipated* by Oelrich, and we choose not to consider the question de novo here on appeal. If the question did not turn on facts not of record, e.g., the nature of the Oelrich signal generator, we would be more inclined to reach the issue under the rationale of In re Pearson, 494 F.2d 1399, 181 USPQ 641 (CCPA 1974).

The Affidavits

In response to the examiner's rejection, four affidavits were submitted in an attempt to show that those of ordinary skill in the art would not have known from the Oelrich patent that the control system there described could be operated satisfactorily with a sub-critical carrier frequency, wherefore operation at such frequency would not have been obvious.

Co-inventors Oelrich and Divigard, conceded by the PTO to be men of ordinary skill in the art, separately aver that the claimed modification was not obvious to them. As objective evidence of his assertion that those skilled in the art, such as himself, did not believe that the Oelrich control was suitable for use with sub-critical carrier frequencies, Divigard appended to his affidavit his own published report on the performance of the Oelrich control which specified the use of super-critical carrier frequencies. In the same vein, an attachment to Oelrich's affidavit indicates that Oelrich and Divigard, when actually confronted with customer requests for adaptations of the Oelrich control to low-inertia systems having very high critical frequencies, did not suggest use of subcritical carrier frequencies, suggesting, instead, that the whole *system* be *modified* to reduce the critical frequency and allow the use of a super-critical carrier frequency.

Friedman, an electrical engineering professor whose credentials as one skilled in the art are unquestioned by the PTO, avers that the use of a sub-critical carrier frequency in an Oelrich-type device would not have been obvious to him.

Kolk, also a professor of electrical engineering of unimpeached qualification as one skilled in the art, analyzes the teachings of Oelrich in detail. The abovenoted distinction between desirable and undesirable degrees of dither in systems such as these is pointed out, the perceptible actuator movement associated with the latter being said to cause mechanical wear. Kolk states that one might be tempted to operate in the sub-critical "valley" in the Fig. 7 frequency-response curve except that the "valley" is too shallow to give acceptable degrees of dither, such being encountered in Fig. 7 only above the critical frequency. Even if the "valley" were deeper, super-critical-frequency operation would still have been called for, in Kolk's opinion, because of the danger of harmonics of the carrier signal (weaker signals at integral multiples of the carrier frequency) exciting the mechanical resonance or interfering with the command signal. Kolk states that the excessive power required to drive a solenoid at a super-critical frequency in a system with a high resonant frequency and the unreliability

introduced by mechanical wear caused by such operation would have led him to reject the Oelrich control for use in low-inertia systems.

Kolk avers that the instantly claimed invention lies in the recognition and utilization of a deep, sub-critical "valley" in the frequency-response curve of low-inertia systems employing the Oelrich control.

The Board

The board, with one member specially concurring, *affirmed* the examiner's rejection noting that all of the affidavits stated that the Oelrich device *should* be operated

Page 214

with a super-critical carrier frequency to obtain a *practical* system having a certain operational life span. Since the board felt that Oelrich teaches the use of super-critical carrier frequencies merely as "preferred," it was of the opinion that the use of a sub-critical frequency in a system where large dither could be tolerated would have been obvious. The affidavits are criticized as failing to state factual bases for the conclusion that the reference as a whole does not teach the use of subcritical frequencies. In essence, the board's position was that sub-critical-frequency operation is broadly contemplated by Oelrich, and that the affidavits fail to establish that such operation was thought to be *not possible.*

The Arguments

Appellants contend here, as they did before the board, that one of ordinary skill in the art would not have read the Oelrich patent, as a whole, as teaching the use of sub-critical carrier frequencies. The affidavits are alleged to establish that the view prevailing among those working in the art at the time the invention was made was that Oelrich-type control mechanisms simply were not suitable for use with subcritical carrier frequencies, e.g., in systems with very high critical frequencies.

The solicitor, in defending the board's position, has interjected yet another theory upon which he urges the rejection might be sustained. It is alleged that Oelrich, at the very least, suggests running a frequency-response analysis of any system in which use of the Oelrich control was contemplated, and, once a low-inertia system was so analyzed, conventional design criteria outlined by Kolk would have dictated operation in the deep sub-critical "valley" that would have been discovered. To this argument, appellants predictably respond by arguing that those of ordinary skill in the art would not have been motivated to run such an analysis, thinking no useful purpose would be served thereby based on their expectation that the Oelrich control was unsuitable for use with sub-critical carrier frequencies.

Opinion

[2] For patentability to be negatived under §103, the PTO must show that the claimed subject matter would have been obvious to one of ordinary skill in the art at the time the invention was made. This entails a determination of the scope and content of the prior art, the differences between the claimed invention and the prior art, and the level of ordinary skill in the art. Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966). In so doing, the PTO usually must evaluate both the scope and content of the prior art and the level of ordinary skill solely on the cold words of the literature. When only the literature is relied upon, occasionally one or both of these factual inquiries becomes distorted. In re Palmer, 59 CCPA 733, 451 F.2d 1100, 172 USPQ 126 (1971). In our opinion, this is such a case.

The evidence of record bearing on the content of the prior art and the level of ordinary skill consists of the words of the Oelrich patent and the affidavits of four persons conceded to have been of ordinary skill in the art. If the affidavits are to be believed, then statements in the Oelrich patent implying that a sub-critical carrier frequency is feasible, albeit not "preferred," must be dismissed as speculation.

[3] Even if speculative, statements appearing in the prior-art literature are good, for purposes of rejection under §103, for all that they would fairly suggest to one of ordinary skill in the art. See In re Wiggins, 488 F.2d 538, 179 USPQ 421 (CCPA 1973); In re Trbojevich, 53 CCPA 1241, 361 F.2d 1013, 150 USPQ 50 (1966). In determining how the Oelrich disclosure was interpreted by those skilled in the art, we are more impressed by what those so skilled *did* than by what they *said.* Even though the words of the Oelrich patent implied that sub-critical operation was feasible, it was never, in fact, considered when a concrete problem requiring such operation was actually presented to two persons of ordinary skill in the art, both intimately familiar with the Oelrich patent. The actions of those skilled in the art reflected by this record indicate that the speculative statements in the Oelrich patent were recognized as such and ignored by those working in the art. The opinions of two other experts are in accord.

We believe the board's criticism of the affidavits for failing to recite factual bases for the conclusions reached is unwarranted in this case. To the extent above noted, the affidavits of Oelrich and Divigard are based on facts. The Kolk affidavit is grounded, in large part, on technically sound applications of unquestioned physical principles. To the extent that all of the affidavits express opinions, they are the opinions of men conceded to be of ordinary skill in the art based on information

Page 215

uniquely within their competence bearing on the level of ordinary skill in the art at the time the invention was made. Their conclusions are reasonable, and thus more credible, in view of the fact that only a single word ("preferred") in the entire eighteen columns of disclosure in the Oelrich patent is in any way contrary thereto.

[4] While we concur in the sentiment expressed by the board that showings of fact are much preferred to statements of opinion, we are of the view that the nature of the matter sought to be established, as well as the strength of the opposing evidence, must be taken into consideration in assessing the probative value of expert opinion. In this case, the expert opinions were introduced on the issue of the level of ordinary skill, which is usually determined by reference to the subjective reaction of persons so skilled, In re Meng, 492 F.2d 843, 181 USPQ 94 (CCPA 1974), and are opposed by a fragile prima facie case of obviousness. In our opinion, the affidavits were sufficient to shift the burden of going forward with the evidence back to the PTO, and that burden has not been sustained. In other words, the prima facie case of obviousness has been overcome.

[5] The solicitor correctly contends that had one conducted a frequency-response analysis on a low-inertia-load system, he would have discovered, as did appellants, that sub-critical control was feasible. The question under §103, however, is not whether one skilled in the art doing what appellants did would have discovered what appellants discovered, but whether it would have been obvious to one of ordinary skill in the art to do what appellants did. In re Lemin, 53 CCPA 1382, 364 F.2d 864, 150 USPQ 546 (1966). In view of the affidavits submitted, we think not.

The decision of the board is reversed.

Reversed

- End of Case -

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